

memorandum



Environment and Resources Division

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To Tom Born and Wendy Hoffman, U.S. Environmental Protection Agency

From James Palardy

Subject Description of Raw Data and Maps Describing Overlaps Between Cooling Water Intake Structures at 316(b) Existing Facilities and Threatened and Endangered Species' Critical Habitat and Habitat Ranges

Accompanying this memo, Abt Associates is providing to EPA an Excel workbook (*T&E.habitat.overlaps.xlsx*) which contains the locations and relevant characteristics of cooling water intake structures (CWIS) used by facilities in-scope of the proposed 316(b) rule. This workbook also identifies CWIS occurring within habitat used by threatened and endangered (T&E) species protected under the Endangered Species Act. In addition to these raw data, 4 maps accompany this memo, each depicting overlaps between CWIS and T&E habitat for a defined subset of facilities. Here, we provide an overview of the raw data and of the maps.

1 Raw Data

The Excel workbook *T&E.habitat.overlaps.xlsx* identifies overlaps occurring between CWIS and T&E habitat. This file contains 3 worksheets: in addition to a brief data dictionary, separate worksheets identify overlaps between CWIS and (1) federally-designated critical habitat (sheet "T&E_crit_hab_rnd"), and (2) T&E species habitat not designated as critical habitat (sheet "T&E_hab_rnd"). Between these data sheets, species-level data are not mutually exclusive: critical habitat designated for a T&E species may overlap with one CWIS, while other habitat (not designated as critical habitat) used by the same species may overlap another CWIS. Consequently, many T&E species appear in both worksheets.

1 Data Contents and Layout

The layout of the two worksheets identifying overlaps between T&E habitat and CWIS are identical. Rows in each worksheet identify one of the 897 CWIS for which EPA has location and water withdrawal data. The 897 CWIS identified occur at 871 in-scope facilities: several large facilities have more than one CWIS. Because facilities with two CWIS may withdraw water from more than one waterbody, and because each CWIS may have different flow characteristics, intake structures were analyzed independently. Facilities with more than one CWIS can be as adjacent rows with identical (or nearly so) latitude and longitude values.

Worksheets identifying overlaps between CWIS and T&E habitat contain the following columns:

- **Lat_Rnd:** Latitude of the CWIS, rounded to the nearest 0.25°. Data are rounded because facility owners declared CWIS locations to be confidential business information (CBI). By

rounding location information, EPA protects this CBI by introducing a sphere of uncertainty with a diameter of approximately 15 miles. Latitude is not rounded in the original analysis.

- Long_Rnd: Longitude of the CWIS, rounded to the nearest 0.25°. Longitude is not rounded in the original analysis.
- MGD125: A flag indicating whether the CWIS withdraws more than 125 million gallons of cooling water (MGD) per day. Values of 1 indicate cooling water withdrawals greater than 125 MGD (528 CWIS); values of 0 indicate cooling water flows less than 125 MGD (369 CWIS). The value of this flag is relevant to a requirement in the proposed 316(b) regulation, whereby facilities withdrawing more than 125 MGD would be conduct detailed entrainment characterization studies. The results of these studies may result in more stringent, facility-specific performance requirements to reduce the mortality of aquatic organisms. Facilities withdrawing less than 125 MGD are exempt from this requirement.
- Compliance: A flag indicating whether or not the CWIS is currently in compliance with the preferred 316(b) option. A value of 1 indicates compliance (168 CWIS); a value of 0 indicates non-compliance (342 CWIS). Values of 2 indicate uncertainty in compliance status (387 CWIS). In these cases, insufficient information is available to reliably project I&E reductions occurring because of the rule (due to insufficient technical data provided in response EPA's Section 316(b) Detailed Questionnaire (DQ) and Short Technical Questionnaire (STQ)). Facilities in compliance would not have increased performance requirements under the proposed rule.
- TE: A flag indicating whether or not the CWIS overlaps with one or more T&E species. A value of 1 indicates overlap; a value of 0 indicates no overlap.
- Remaining columns: A flag indicating whether or not the CWIS overlaps with the T&E species identified (by its latin binomial) in the column header. A value of 1 indicates overlap; a value of 0 indicates no overlap.

2 Data Sources

CWIS Characteristics

Data for the latitude, longitude, and flow characteristics of CWIS were collected from EPA's DQ and STQ. Characteristics derived from these surveys (and other economic information) form the basis of EPA's facility weights. These facility weights are used to extrapolate the costs and benefits of the proposed rule from the 871 known in-scope facilities to the estimated 1260 in-scope facilities nationwide. The 871 known facilities represent a census of all potentially affected generators, based on a screener survey, and a sample of manufacturing facilities. Although unlikely, it is possible that a small number of manufacturing facilities with large daily water withdrawals are not included in this list. Compliance values are calculated by EPA based upon engineering information provided in the DQ and STQ. These calculations estimate the effectiveness of in-place impingement and/or entrainment reduction technology currently in-place. Only those facilities with sufficient data to estimate compliance (i.e., 342 CWIS not in compliance, 168 CWIS in compliance) were given weights used to extrapolate costs and benefits beyond the survey sample. Facilities for which CWIS compliance is unknown (387 CWIS) were not weighted.

T&E Habitat Overlaps with CWIS

Data beginning with the column “TE” indicate overlap between a CWIS and habitat used by T&E species. To determine overlaps, CWIS location information was obtained from the DQ and STQ (as described above). Habitat data were obtained from the following sources:

- Worksheet “T&E_crit_hab_rnd”: Critical habitat data (in the form of GIS shape-files and line files) used to identify overlaps were obtained from the US Fish and Wildlife Service’s Critical Habitat Portal (criticalhabitat.fws.gov/crithab/), and from NOAA Fisheries’ Critical Habitat GIS portal (www.nmfs.noaa.gov/gis/data/critical.htm).
- Worksheet “T&E_hab_rnd”: Habitat data (in the form of GIS shape-files, line files, and HUC-10 stream reaches) were primarily obtained from the International Union for the Conservation of Nature (www.iucnredlist.org/initiatives/mammals/description/download-gis-data) and from NatureServe Explorer (www.natureserve.org/explorer/). Additional habitat range data were obtained from NOAA’s Essential Fish Habitat data inventory (www.habitat.noaa.gov/protection/efh/newInv/index.html).

2 Maps

Using the raw data described above, EPA requested that Abt Associates create four maps to illustrate the potential of the proposed 316(b) regulation to benefit T&E species.

1 All 316(b) Facilities

EPA estimates that a total of 1260 facilities are within scope of the proposed 316(b) regulation. However, data for only 871 facilities were obtained from the DQ and STQ. This map illustrates the geographic distribution of all 897 CWIS (present at these 871 facilities) for which location data are available.

2 316(b) Facilities with T&E Species and Critical Habitat Overlap

CWIS / Critical Habitat Overlaps

A total of 50 CWIS overlap with habitat designated to be critical habitat. Although found throughout the country, clusters of CWIS / Critical Habitat overlap occur in the Pacific Northwest (CWIS overlaps with Pacific Salmonids), Florida (CWIS overlaps with the Florida Manatee), and Maine (CWIS overlaps with Atlantic Salmon). Those CWIS overlapping with both critical habitat and other T&E habitat are classified as CWIS overlapping with critical habitat on this map.

CWIS / T&E Habitat Overlaps

A total of 639 CWIS overlap with habitat used by one or more T&E species. These overlaps occur throughout the country. Notably, because of the global distributions of several species of sea turtles, nearly all coastal facilities overlap with at least one T&E species.

3 316(b) Facilities with T&E Species Overlap by Flow

Nationally, 528 CWIS overlapping with T&E habitat withdraw less than 125 MGD, and 369 CWIS overlapping with T&E habitat withdraw more than 125 MGD. With the exception of the Pacific Northwest and Southwest (where facilities withdrawing > 125 MGD are rare due to abundant hydro power and restricted water supplies, respectively), there is no clear pattern to the distribution of facilities characterized by flow. Under the preferred option of the proposed rule, facilities withdrawing > 125 MGD are required to conduct entrainment characterization studies. Because smaller facilities are frequently interspersed with large facilities, knowledge gained

through studies occurring at large facilities may be sufficient to assess the probability of entrainment mortality occurring at a substantial proportion of small facilities nationwide.

4 316(b) Facilities with T&E Overlap and Not in Compliance with the Preferred Option

There are three components to the proposed regulation. First, existing facilities that withdraw at least 25 percent of their water from an adjacent waterbody exclusively for cooling purposes and have a design intake flow of greater than 2 MGD would be subject to an upper limit on how many fish can be killed by being pinned against intake screens or other parts at the facility (impingement). The facility would determine which technology would be best suited to meeting this limit. Alternately, the facility could reduce their intake velocity to 0.5 feet per second (fps). At this withdrawal rate, most juvenile and adult fish are able to swim away from the facility's CWIS. Some subset of facilities are likely to use this option to comply with the proposed rule, though the number of facilities able and likely to reduce intake velocity to 0.5 fps is unknown.

Second, existing facilities that withdraw very large amounts of water - at least 125 MGD -would be required to conduct studies to help their permitting authority determine whether and what site-specific controls, if any, would be required to reduce the number of aquatic organisms sucked into cooling water systems (entrainment). This decision process would include public input.

Third, new units that add electrical generation capacity at an existing facility would be required to add technology that is equivalent to closed-cycle cooling (continually recycles and cools the water so that minimal water needs to be withdrawn from an adjacent waterbody). This can be done by incorporating a closed-cycle system into the design of the new unit, or by making other design changes equivalent to the reductions associated with closed-cycle cooling. Closed-cycle cooling systems—often referred to as cooling towers or wet cooling-- are the most effective at reducing entrainment.

Nationally, of the 510 CWIS for which compliance with the preferred option is known, 342 (67%) are not in compliance and 168 (33%) are in compliance (the compliance status of 387 facilities is unknown). Assuming a similar distribution of compliance among those facilities where compliance status is unknown, the proposed 316(b) regulation is likely to reduce I&E mortality at 600 CWIS. This suggests that the proposed rule may reduce the risk of T&E mortality, particularly in those regions where in-scope facilities are common and the majority of which are not in compliance (e.g., Mississippi River Delta).